SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report for

PROPOSED AMENDED RULE 1107 – COATING OF METAL PARTS AND PRODUCTS

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EXECUTIVE SUMMARY

Rule 1107 was adopted in June 1979 to control VOC emissions from metal coating operations. Rule 1107 sets VOC limits for twenty-two categories of coatings classified as air-dried (cured below 194 degrees F) or baked (cured above 194 degrees F). The rule establishes limits for metal coatings in general and includes multiple specialty categories. The broadest of the specialty categories include prefabricated one- and two- component coatings and extreme high-gloss coatings. The remainder of the coating categories encompasses mostly niche operations.

The rule has been amended 17 times since 1979, four times in the last 13 years. However, in those last 13 years there has only been one coating limit reduction – Air-Dried Extreme High Gloss and Prefabricated Architectural coatings in 2005.

Rule 1107 applies to all metal coatings operations except those performed on aerospace assembly, magnet wire, marine craft, motor vehicle, metal container, and coil coating operations. Typical facilities include metal furniture manufacturers, fabricated metal product manufacturers, small and large appliance manufacturers, metal finishers and the paint and coating manufacturers that supply products to the metal manufacturing shops.

The purpose of Proposed Amended Rule (PAR) 1107 is to further reduce VOC emissions from metal coatings by relying on improvements in the coating technology during the last 13 years. Staff proposes the following requirements for PAR 1107:

- Amend VOC limits for certain metal coating categories.
- Establish new coating categories and VOC content limits.
- Expand the applicability of the rule to include certain metal stripping operations.
- Expand and clarify the definition and requirements for Extreme-Performance coatings.
- Consider limited exemptions for coatings containing tertiary-butyl acetate (TBAc) and dimethyl carbonate (DMC).
- Include a prohibition of sales for metal coatings that exceed applicable VOC content limits.
- Prohibit the use of Group II Exempt Solvents in metal coatings or strippers.
- Remove and limit existing exemptions.
- Include streamline recordkeeping options for Super Compliant coatings.
- Include additional administrative requirements and corrections to clarify rule language and remove obsolete provisions.

As proposed, the rule would reduce emissions by 1.26 tons per day with an estimated annual cost of $4.0 million dollars. The maximum overall cost-effectiveness of the proposed amendment would be $8,698 per ton of VOC emissions reduced.

The 2007 Air Quality Management Plan (AQMP), specifically Control Measure CM#2007 MCS-07 – Application of All Feasible Measures, explicitly lists coating and solvent rules to achieve additional VOC reductions. PAR 1107 will partially implement CM#2007 MCS-07.

BACKGROUND

Rule 1107 was adopted in June 1979 to control VOC emissions from metal coating operations. The rule has been amended 17 times since, four times in the last 13 years. However, in those last 13 years there has only been one coating limit reduction – Air-Dried Extreme High Gloss and Prefabricated Architectural coatings in 2005. During that time frame there have been technological advances in coating resin systems, both waterborne and solvent-based, including the use of exempt solvents, that have significantly lowered the volatile organic content while maintaining, and in some cases, improving performance properties compared to conventional formulations.

Rule 1107 sets VOC limits for twenty-two categories of coatings classified as air-dried (cured below 194 degrees F) or baked (cured above 194 degrees F). The rule establishes limits for metal coatings in general and includes multiple specialty categories. The broadest of the specialty categories include prefabricated one- and two- component coatings and extreme high-gloss coatings. The remainder of the coating categories encompasses mostly niche operations.

The industry sectors that make extensive use of coatings applied to metal parts and products include:

- Steel Product Manufacturing from Purchased Steel (NAICS 3312)
- Cutlery and Handtool Manufacturing (NAICS 3322)
- Architectural and Structural Metals Manufacturing (NAICS 3323)
- Boiler, Tank, and Shipping Container Manufacturing (NAICS 3324)
- Hardware Manufacturing (NAICS 3325)
- Coating, Engraving, Heat Treating, and Allied Activities (NAICS 3328)
- Other Fabricated Metal Product Manufacturing (NAICS 3329)
- Machinery Manufacturing (NAICS 333)
- Computer and Electronic Product Manufacturing (NAICS 334)
- Electrical Equipment, Appliance, and Component Manufacturing (NAICS 335)
- Motor Vehicle Parts Manufacturing (NAICS 3363)
- Other Transportation Equipment Manufacturing (NAICS 3369)
- Metal Household Furniture Manufacturing (NAICS 337124)
- Institutional Furniture Manufacturing (NAICS 337127)
- Office Furniture (except Wood) Manufacturing (NAICS 337214)
- Showcase, Partition, Shelving, and Locker Manufacturing (NAICS 337215)
- Other Miscellaneous Manufacturing (3399)

The industries that supply coatings to facilities are covered by the Paint and Coating Manufacturing sector (NAICS 325510)

According to the 2007 AQMP, the total emissions inventory for PAR 1107 is 2.82 tons per day. The inventory includes emissions from small sources with no permits, small sources with permits

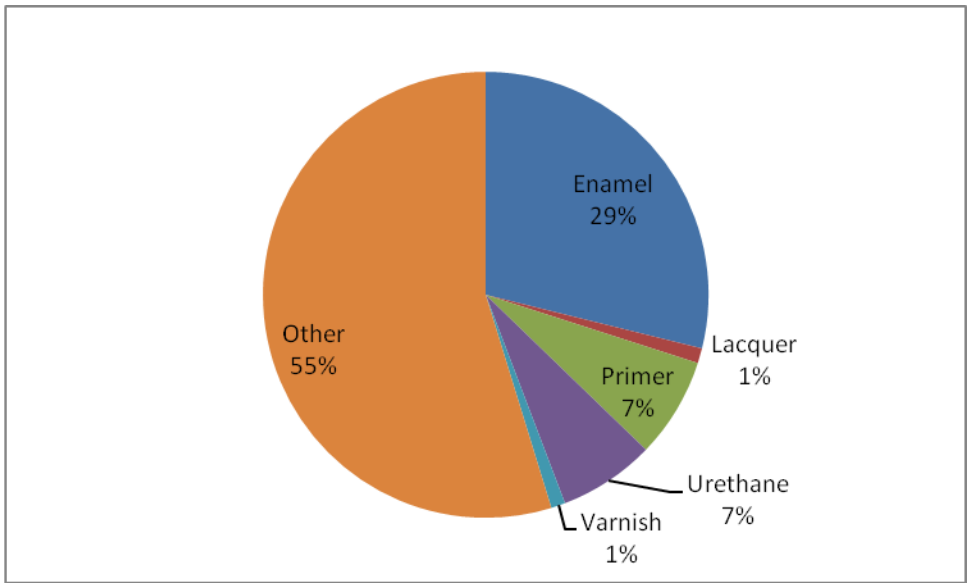
and facilities that report as part of the Annual Emissions Reporting (AER) Program. Inclusion in the AER Program is limited to larger facilities that emit at least four tons per year of a criteria pollutant. While larger facilities represent a significant portion of the overall inventory of Rule 1107, the bulk of the emissions come from the large number of smaller facilities. In 2006-7, 377 companies reported 1.4 tons of VOC emissions from metal coating operations through the AER program, approximately a 27 percent decrease from 2002-3 reported emissions. However, the emission decrease was primarily (more than 70 percent) due to the reduction of VOC content in Extreme High Gloss and Prefabricated Architectural coatings. The remaining decrease came from increased use of low-VOC products in other coating categories.

TECHNOLOGY ASSESSMENT

Metal coatings protect, and in some cases, beautify the substrate they are applied upon. These coatings provide some level of protection from impact, abrasion and corrosion. They may also be required to retain a consistent color and gloss level over an extended period of time. In addition to the desired properties of coating after curing, coatings must also have other acceptable characteristics, especially during application. This can include shelf life, sprayability, rheology, flow, pot life (for multi-component coatings), time-to-tack free, time-to-dry to recoat and time until full cure. Quick drying times are not always the most desired feature. Acceptable drying times usually fall within a range that varies per the coating process and operation.

Of the metal coating usage reported to the District in 2006-7, nine percent were powder coatings. Nearly two-thirds of the liquid coating emissions were vented to a control device. The remaining uncontrolled liquid coatings were reported as the following:

Chart 1: Metal coating type by volume



The Other category comprises a wide range of coatings including many that could be classified in one of the other specified categories. One of the few generalizations that can be made about the Other category is that nearly all of the Prefabricated Architectural Component coatings are

reported in this category. The Varnish and Lacquer categories are relatively minor contributors and generally represent niche applications.

From a review of reported emissions, the sales weighted average material VOC and sales weighted average coating VOC (less water and exempt solvents) were determined. The review was conducted on facilities that reported more than 100 gallons of annual usage and the coating VOC content was determined by reviewing inspector reports and associated material safety data sheets or technical data sheets. The results of the review are presented in Table 1 below.

Table 1: Sales Weighted Average VOC Content

Coating Type	Sales Weighted Average Material VOC (g/l)	Sales Weighted Average Coating VOC (g/l)	Volume below 120 g/l Coating VOC (percent)
Enamel	136	158	84
Primer	141	187	26
Urethane	227	272	18
Other	91	114	62
Overall	96	144	63

One of the primary limitations of reported data is a lack of correlation between Coating Type and the applicable Rule 1107 category. For example, a niche use of a military specified urethane primer could be reported in either the Primer, Urethane or Other categories. Notwithstanding that limitation, the main uses of metal coatings - General, Architectural and Extreme High-Gloss - can fall into any of the above coating types.

Air-dried coatings are typically single-component systems such as an alkyd or acrylic that do not cure by chemical reaction and do not need to be baked. Single-component coatings are available as acrylics, alkyds, polyurethanes, silicones, and blends. They are available in both waterborne and solvent-based formulations. Some facilities utilize heat to accelerate the cure time of air-dried coatings. Baked coatings are similar but require temperatures greater than 194 degrees F to fully cure. Examples include thermoset coatings and ultra-violet curable coatings that utilize heat and light, respectively, to initiate curing. Multi-component coatings require the addition of an activator or catalyst to crosslink coating molecules. Most multi-component coatings are epoxies and polyurethanes.

Low-VOC metal coating formulations can be broadly described as powder, ultra-violet curable, waterborne, high solids and solvent-based using exempt solvents.

Powder Coatings

Powder coatings are 100 percent dry solids materials formulated as thermosetting and thermoplastic coatings. Thermoplastic powders are applied to heated parts and immediately are fused to the metal substrate. Thermoset powders are applied to parts electrostatically and then the part is cured in an oven. Although powder coatings are generally more expensive per pound than liquid baked coatings, more coverage is gained due to their 100 percent solids content, which often results in a cost savings. Additionally, VOC emissions are nearly non-existent.

Challenges for powder coating include parts with corners where the powder may not adhere, multi-color applications and metal parts that can't be cured at high temperatures.

UV Coatings

UV curable coatings are another extremely low-VOC content technology available to metal coating facilities. UV coatings consist of monomers, oligomers, photoinitiators and additives that are activated and cured using UV light. Curing time can be minimal with simple (usually flat) geometries providing facilities the opportunity to increase production. Polymerization is more challenging with coatings applied to variable geometries. In general, the cost of UV coatings and the infrastructure to cure the coatings is more expensive than conventional coating but become more cost competitive for high speed and high volume applications.

High Solids Coatings

High solids coatings are viscous and contain greater than 60% by volume of solids. In-line heaters and high pressure spray equipment may be necessary to make them more sprayable. High-solids coatings may be a two-component coating that rapidly cures, requiring special plural spray systems. High-solids coatings are applied in higher film builds and are more desirable where the protective properties are more important than the decorative properties of the coating.

Waterbornes

Waterborne technologies represent significant reductions in emissions simply because the major solvent is water. Almost all waterborne coatings contain small amounts of organic solvents as additives or co-solvents. Heating or baking provides improved curing times and durability because of molecular polymerization through heat. Most of the low-VOC alternative coatings currently in use are waterborne acrylic, enamels and polyurethanes. In addition to low coating VOC (less water and exempt solvents), waterborne metal coatings have very low material (actual) VOC contents.

EXEMPT SOLVENT COATINGS

Traditional coatings are made with VOC containing solvents. Exempt solvent coatings replace some or all of the VOC containing solvents with exempt solvents such as acetone or parachlorobenzotrifluoride (PCBTF). The coatings function similarly but may have different characteristics, particularly drying times, depending on the physical properties of the exempt solvents. Price, objectionable odor and overly fast cure times have generally limited the use of exempt solvent coatings. Both TBAc and DMC are proposed for limited exemption and may provide additional opportunities for exempt solvent coatings. Both proposed exempt solvents have physical properties similar to traditional coating solvents, such as xylene or methyl ethyl ketone, and may be more easily adaptable to reformulation, while retaining the solvent-based resin systems traditionally used by the industry.

A list of currently available coatings that comply with the proposed limits is provided in Appendix A. The list is not exhaustive but does represent a wide range of coating types available for general, architectural, primer and high gloss applications. This list will be updated during the rule development period. The list does not include powder or ultra-violet (UV)

curable coatings that have long been established as very-low VOC metal coatings. Of the liquid coatings provided, these low-VOC technologies fall mainly into the following coating types:

- Waterborne acrylics
- Waterborne enamels
- Waterborne urethane acrylic polymers
- Waterborne polyurethanes
- Two component epoxies
- Two component waterborne acrylics
- Exempt solvent polyurethanes

The coatings provided have a wide range of characteristics (pot life, cure times, etc.) that allow them, as a whole, to be used over many different types of applications. However, an individual coating may have characteristics that make them ideal in a particular application but completely unsuitable in another type of application. As is true with even higher-VOC metal coatings, shops must determine the desirable characteristics and choose accordingly.

The proposed rule also includes a prohibition of use for Group II exempt solvents. While this will have little impact on coating formulations, it may have some impact on paint stripping formulations. Methylene chloride, a Group II exempt solvent, is commonly used in traditional stripping formulations because of its aggressive, fast-acting properties. However, because of its toxicity and regulation as a Hazardous Air Pollutant, industry has offered non-methylene chloride based strippers. Alternatives to methylene chloride based stripping formulations include inorganic liquid strippers and abrasive blasting (plastic media and wheat starch among others). The inorganic liquid strippers may be alkaline, acidic or contain hydroxytoluene. The VOC content limit for metal strippers is 200 g/l which allows for inclusion of some formic acid/benzyl alcohol formulations as well. Another option is to use high temperatures to burn off metal coatings.

PROPOSED AMENDED RULE

Staff proposes the following for PAR 1107:

Purpose and Applicability

The purpose and applicability of the rule will be expanded to include metal stripping operations not necessarily associated with an on-site coating operation. Clarification is provided to note that the rule applies to persons who use metal coatings and manufacturers, distributors and suppliers who supply, sell or offer for sale metal coatings.

Definitions

To provide greater flexibility and direction, the definition for Extreme-Performance coating has been expanded to include multi-substrate metal and carbon composite surfaces and other operations approved by the Executive Officer. A standard for heavy abrasion has been included and the requirement for facilities to apply for approval to utilize this provision has been modified to apply only to those requiring Executive Officer approval. Shops that qualify under one of the specified applications will no longer need to apply for approval beforehand.

A definition has been included for Graphic Arts coatings to allow artists to hand paint signs. Previously, signs had to be hand-painted while attached to buildings to qualify for a higher VOC limit, requiring scaffolding, cranes and safety equipment. To protect the safety of the artists doing the painting, the proposed rule will have the same VOC content limit included in Rule 1113 – Architectural Coatings if it is painted on the ground.

The definition for Extreme High-Gloss coating has been modified to require a higher reflectance, 95 instead of 75. In addition, a new category, High-Gloss has been included for coatings with reflectance between 75 and 95. This limits high-VOC glossy coatings to only those with very high gloss and provides an interim limit for coatings that exhibit some gloss, in order to better accommodate some low VOC technologies.

Definitions for Lacquer and Primer have been included to distinguish those types of metal coatings from the General metal coating category. The proposed VOC content limit for General coatings may not be suitable for lacquers and primers, necessitating separate limits and definitions to describe these types of products.

Definitions for Person, Metal Coating, and Stripping have been included to clarify the applicability of the rule.

The definition for Prefabricated Architectural Component coatings has been modified to be consistent with the definition of Architectural Component included in Rule 1113 – Architectural Coatings. The VOC content limits for the category have been made consistent between the two rules for parts and products painted in a shop setting or a field setting. Previously, the more controlled shop setting had significantly higher limits.

The definition for Reactive Diluent now includes the calculation for determining VOC content which was previously located elsewhere in the rule.

To clarify the intent of Repair Coating, the definition has been modified to allow recoat of previously painted metal parts or products, even if the subject part or product isn't being manufactured for sale. Only a small portion of the part may be recoated, limited to the area that has sustained mechanical damage.

Finally, Super-Compliant Material was included in the definitions to facilitate streamlined recordkeeping provisions. Super-Compliant Material will apply to metal coatings with a material VOC content of 50 g/l or less to be eligible for limited recordkeeping.

Requirements

The proposed rule will establish lower VOC limits for General, Prefabricated Architectural and Primer coatings. The General category will combine the existing General One-Component and General Multi-Component categories. The Prefabricated Architectural coatings category will combine the Prefabricated Architectural One-Component, Prefabricated Architectural Multi-Component and High-Performance Architectural categories. A subset of the Extreme High-Gloss category will be separated as a High-Gloss category. In addition to the High-Gloss category, three other new categories will be created: Primer, Lacquer and Graphic Arts.

The General coatings category encompasses all metal coating operations not specifically listed in a specialty coating category. Currently, the rule recognizes two types of general coatings: One-component and multi-component. Multi-component coatings are defined as a coating that requires the addition of a separate chemically reactive resin to form an acceptable dry film. The baked limits for the General One-Component and General Multi-Component limits are the same. The air-dried limit for General Multi-Component is currently 340 g/l while the General One-Component limit is 275 g/l. In 2013, the proposed rule will remove the distinction between one-component and multi-component General coatings. The limit for air-dried Multi-Component coatings will be lowered from 340 g/l to 275 g/l. Appendix A includes five multi-component General coatings that currently are below 160 g/l, four of which are below 100 g/l. Currently, 39% of the reported urethane coatings, which are predominantly multi-component coatings, have a VOC content below 275 g/l.

In 2015, the proposed limit for all General coatings are lowered to 100 g/l. Excluding Primers, Lacquers and Varnishes, currently just over 60 percent of the coatings reported have VOC contents within 20 percent of the proposed limit. This figure excludes coatings vented to a control device but does include specialty coatings with higher VOC content limits (e.g. Extreme-High Gloss coatings). Table 2 below illustrates the breakdown by coating type reported.

Table 2: Reported Low-VOC Coatings

Coating Type	Volume (thousands of gallons)	Reported below 120 g/l (percent)
Enamel	94.0	83
Urethane	55.8	18
Other	437.1	61
Overall	**586.9**	**60**

Staff has identified thirty General coatings that currently have a VOC content near or below the proposed limit. Coatings with VOC contents slightly above the limit were included because there may be only minor adjustments to the formulation, including the addition of newly exempted solvents, that will further decrease their VOC content. While the identified coatings provide low-VOC alternatives for a range of applications, additional time has been provided to allow for the full range of coatings to be completely developed. Additionally, the Extreme Performance coating category has been broadened to allow facilities added flexibility provided that they are able demonstrate the need for higher-VOC coatings.

The proposed rule will also establish a VOC limit of 100 g/l for Prefabricated Architectural coatings. As mentioned earlier, the Prefabricated Architectural coating category will include the one- and multi-component Prefabricated Architectural categories as well as the High-Performance Architectural coating category. The High-Performance Architectural coating category limits the VOC content for architectural subsections that meet the Architectural Aluminum Manufacturer Association's publication number AAMA 605.2-1980. The current standard (now AAMA 2605-05) certifies only one manufacturer in the Southern California area. That facility controls VOC emissions through a control device.

The overwhelming majority of Prefabricated Architectural coatings are very similar to products subject to Rule 1113 – Architectural Coatings except that they are painted within a factory

setting rather than painted in the field. Intuitively, painting within a controlled factory setting appears less challenging than painting outside. Within the shop, temperature, air flow and dust is much more manageable. However, shop coating operations may be more constrained with respect to time and space as completed parts must cure quickly enough to allow for stacking and shipping in a reasonable amount of time. In a shop setting, this is accomplished by optimizing heat and humidity.

Staff has identified 43 Prefabricated Architectural coatings that currently have VOC contents near or below the proposed limit, some including TBAc as an exempt solvent. Most of the coatings are usable in both a field setting and a shop setting. Nearly all of the coatings have been successfully used for several years in the field because of the low-VOC requirements for Industrial Maintenance coatings in Rule 1113. Because of this extensive experience, the effective date for these proposed limits is January 1, 2013.

Primers will be distinguished from General coatings and a separate VOC limit is proposed. Primers are coatings applied directly to the metal to provide corrosion resistance and improve adhesion for subsequent coats. Decorative properties are much less critical for primers with the exception that they provide an excellent foundation for subsequent decorative coatings. Seventeen low-VOC primers have been identified below or near the proposed VOC limit and are included in Appendix A. Similar to General coatings, additional time has been provided to allow for minor formulation modifications and possible incorporation of newly exempted solvents. Currently 26 percent of the reported primer volume is below or near the proposed limit

Lacquer coatings will also be distinguished from General coatings but will retain the current limits. Unlike the other categories recommended for limit reductions, there are few coatings that would meet a lower limit and little (less than two percent) reported usage. The overall usage is also very small (one percent of volume reported) and any emission reductions would be minimal at this time.

A new specialty category, Graphic Arts, will be included in the proposed rule as discussed above. The VOC limit, 500 g/l, and definition are the same as Rule 1113. The volume of hand applied Graphic Arts coating is expected to be negligible.

A summary of the proposed limits is provided in Table 3 below.

Table 3 – Summary of Proposed Limits

Coating Category	Air-Dried gm/l Current	Baked gm/l Current	Proposed (Air-Dried & Baked) gm/l 1/1/2013	Proposed (Air-Dried & Baked) gm/l 1/1/2015
General One-Component*	275	275	275	100
General Multi-Component*	340	275	275	100
Lacquer	N/A	N/A	275	275
Primer	N/A	N/A	275	100
Prefabricated Architectural One-Component**	275	275	100	100
Prefabricated Architectural Multi-Component**	340	275	100	100
High-Performance Architectural**	420	420	100	100
Graphic Arts	N/A	N/A	500	500
High-Gloss	N/A	N/A	275	100

* Combined into "General" category
** Combined into "Prefabricated Architectural Component" category

Exempt Solvents

A limited exemption will be included for the use of TBAc and DMC. The District modeled emissions from two facilities from four volume usage categories (less than 100 gallons per year, less than 1,000 gallons per year, less than 2,000 gallons per year and greater than 2,000 gallons per year) to estimate the potential health risks from a limited exemption. Real facility parameters were used including building configurations, stack location, receptor distance and meteorological data. The estimates indicate that some facilities using TBAc may pose an unacceptably high risk to nearby receptors in certain situations. Because of uncertainty in worker exposure scenarios, DMC is included as a exempt chemical of concern.

Coatings that contain these chemicals may exclude them from the determination of VOC content if the operator applies for and receives a permit to operate to use one of these exempt solvents with a concurrent commitment that the coating will be used within a paint spray booth or a fully enclosed area where an exhaust fan discharges the exhaust air from the enclosure outside of the building. The permit application requirement allows the District to conduct a site-specific Health Risk Assessment to ensure that the use of an exempted solvent will not pose an undue risk to sensitive receptors or offsite workers. Pursuant to Rule 1401, if the carcinogenic risk exceeds ten in one million or the hazard index exceeds 1.0, the application must consider limiting daily usage to maintain the health protective thresholds established in Rules 1401 and 1402, or may be rejected and the exempt solvent will be included when determining VOC content.

Requiring the coating to be used within a paint spray booth or enclosed area will mitigate area source emissions and may address some worker exposure concerns. In the case of TBAc, it will continue to be considered a VOC for recordkeeping, emission reporting, modeling and inventory requirements. This is consistent with U.S. EPA's limitations placed on the exemption of TBAc which are unique to TBAc as opposed to other solvents exempted by the U.S EPA. San Joaquin

Valley Air Pollution Control District has established a similar health protective approach and the coatings industry, including the American Coating Association, supports this approach for PAR 1107.

The options available for coating application equipment will be expanded for high viscosity coatings. Many very high solids coatings have a viscosity greater than 15,000 centipose and act as non-Newtonian fluids (meaning they don't flow). For a frame of reference, 15,000 centipose has the consistency of honey. To spray such thick fluids, very high pressures are necessary (greater than 1,000 psi) making the use of HVLP spray equipment difficult. Many shops are forced to thin the high solids coatings with VOC solvents to allow them to be sprayed, thus eliminating the benefit of the low-VOC high solids coatings.

Finally, VOC containing coatings will be required to be stored in non-absorbent, non-leaking containers that are to be kept closed except while in use. This will reduce fugitive emissions from open paint cans and limit the emissions for added thinners needed to restore the coating to a usable condition. This provision will also eliminate the practice of allowing unused paint to dry in the container for disposal as municipal solid waste rather than properly handled as a potentially hazardous waste.

General Prohibitions

The prohibition section of the rule has been expanded to include language that limits manufacturers, suppliers and distributors from selling or supplying non-compliant coatings. Similar prohibition of sale provisions have been included in nine of the District's coating rules, including Rule 1113 – Architectural Coatings, Rule 1145 – Plastic, Rubber and Glass Coatings, Rule 1151 - Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations. The prohibition of sale encourages manufacturers and suppliers of metal coatings to provide compliant materials to the facilities that use their products in the District. This is particularly helpful for small shops that may have a limited understanding of applicable VOC limits.

However, manufacturers and suppliers are concerned that they will be held responsible for the improper use of their coatings when they have little control over the product once it is in the hands of the end-user. To address these concerns, exceptions are included in the prohibition of sale for the following:

- Coatings for use outside the District
- Coatings vented to a control device
- Coatings that can be used on multiple substrates provided they meet other applicable District rules
- Coatings sold to an independent distributor where the supplier has informed the distributor in writing that the coatings are non-compliant for use in the District

An additional requirement is included that limits the use of Group II exempt compounds in metal coatings or metal strippers to less than 0.1 percent by weight. This will prevent the unlimited use of exempt compounds where sufficient concern has been identified to designate the compound as either toxic, potentially toxic, upper-atmosphere ozone depleters, or cause other environmental impacts. Group II exempt compounds are not normally found in coatings. However, one Group

II exempt compound, methylene chloride, is used in metal stripping operations, where viable alternatives can be used.

Test Method
Test methods, ASTM D 1200-10 and ASTM D 4060 have been included for determining viscosity and heavy abrasion respectively.

Exemptions
The exemption for High-Performance Architectural, Vacuum-Metalizing and Pretreatment coatings used at facilities that emit a total of 10 tons or less of VOC per year will be eliminated. As mentioned earlier, the only facility qualified under the existing High-Performance Architectural coating category already vents emissions to a control device. The Vacuum-Metalizing and Pretreatment categories already are allowed specialty VOC content coating limits of 420 g/l. Previous rule amendments have eliminated the far smaller one gallon per day exemption. Additionally, the expansion of the Extreme Performance coating definition will allow companies to request approval if the normal 420 g/l VOC content limit is insufficient for some reason.

Essential public service coatings will be limited to products with VOC contents of 500 g/l or less.

The high volume (66 gallon per month) exemption for electrocoating (or E-coat) will be eliminated. Advances in electrocoating technology provide low-VOC, non-Hazardous Air Pollutant (HAP) as an extension of the electroplating line. In fact, the electrocoating process is now a low-VOC alternative to traditional VOC-containing metal painting.

A recordkeeping exemption has been included for Super-Compliant Materials as an incentive for their use. Super-Compliant Materials are coatings with a material VOC content less than 50 g/l. The exemption will streamline recordkeeping provisions. For facilities that are able to demonstrate that total permitted and non-permitted emissions are below four tons per year those facilities will not be required to keep daily records of their Super-Compliant Material usage. Because of U.S. EPA recordkeeping requirements, coatings containing TBAc are not eligible to be considered as a Super-Compliant Material.

Qualification for Classification as Extreme-Performance Coating
To facilitate the use of the Extreme-Performance coating classification, language has been included noting the information for facilities to provide for evaluation. The requirement to provide this information has been limited to facilities seeking Executive Officer approval for specialty applications.

EMISSION INVENTORY

The emission inventory for the proposed rule was done by reviewing reported emissions for 2006-7 and 2007 AQMP inventory emissions for metal coatings. In the 2006-7 time period, 377 companies submitted information to the District's AER Program. There are 949 other facilities in the Clean Air Support System (CLASS) with permits for spraying coatings subject to Rule

1107. There are also smaller facilities that do not have permits with the District. During the 1998 amendments to Rule 1107 that number was estimated to be 425 using unpermitted (Rule 219 qualified) diptanks and open spray equipment. As a fraction of the total number of AER and CLASS facilities, this represented 16 percent of the total or 212 unpermitted facilities.

The VOC emissions reported through the AER program in the 2006-7 time period total 1.36 tons per day, 64 percent or 0.87 tons per day from uncontrolled liquid coatings. The remainder of the AER reported VOC emissions are from sources using control devices (32 percent or 0.43 tons per day) and powder coating (4 percent or 0.06 tons per day). VOC emissions from the CLASS facilities, using the 2007 AQMD inventory, is 1.42 tons per day. The unpermitted sources are assumed to be using an average of 15 gallons of coatings per month with an average VOC content of the AER sources (96 g/l or 0.8 lb VOC/gal). Total daily VOC emissions from unpermitted sources are 0.04 tons per day. Complete daily VOC emissions from all sources are 2.82 tons per day as detailed below in Table 4.

Table 4 – VOC Emission Inventory

Emission Source	**Emissions (tons per day)**
AER (liquid, uncontrolled)	0.87
AER (liquid, controlled)	0.43
AER (powder)	0.06
CLASS	1.42
Non-permitted	0.04
Total	**2.82**

EMISSION REDUCTIONS

The proposed rule will limit VOC content for Prefabricated Architectural coatings to 100 g/l in 2013. Also effective in 2013, the Extreme High-Gloss category will be subdivided with a lower limit for High-Gloss coatings. Effective January 2015, General, Primer and High-Gloss coatings will be limited to 100 g/l as well.

The changes to the rule limits will have no impact on the inventory for emissions from facilities with control devices and those using powder coatings. The emission reductions are calculated using the information from the uncontrolled AER sources and then applied in the same ratios to the CLASS and non-permitted facilities. The volume of Prefabricated Architectural and Extreme High-Gloss coatings was taken from the 2005 Rule 1107 Amendment Staff Report. Finally, it is assumed that General coatings represent 90 percent of the remaining coatings after Prefabricated Architectural, Extreme High-Gloss and Primer coatings are excluded.

To determine the impacted emissions, the coatings at or below the proposed limits were reviewed to determine the volume and sales weighted average material VOC content. (See Table 1). The sales weighted average material VOC content and volume of the remaining coatings was determined. The emissions reductions are calculated by assuming that the material VOC content of those above the proposed limit will be reduced to the same sales weighted average material VOC content of the products that already meet the proposed limit.

The emission reductions, for AER Uncontrolled Liquid coatings only, by coating type is presented in Table 5 below.

Table 5 – Coating Volume (AER Uncontrolled Liquid Coatings Only)

Coating Category	Total Volume (1,000 gallons)	Volume above proposed limit (1,000 gallons)	SWA Mat'l VOC content above limit	SWA Mat'l VOC content after 2013	SWA Mat'l VOC content after 2015	Emission Reductions (tons per day)
Prefabricated Architectural	61.9	23.5	223	57	N/A	0.04
Primer	58	42.9	261	N/A	76	0.09
General	441.2	163.2	227	N/A	75	0.28
Extreme High-Gloss	5.2	N/A	N/A	N/A	N/A	N/A
High-Gloss	25.7	21.1	311	103	75	0.05
Lacquer	8.7	N/A	N/A	N/A	N/A	N/A
Varnish	8.2	N/A	N/A	N/A	N/A	N/A
Specialty (17 categories)	189.1	N/A	N/A	N/A	N/A	N/A
Total	**798**	**250.7**				**0.47**

For AER uncontrolled liquid coatings, the proposed limits will result in a reduction of 0.47 tons per day or a 54% reduction of VOC emissions. Using the same ratio of emission reductions for the other emission sources impacted by the proposed rule limits, the total VOC reduction will be 1.26 tons per day of VOC emissions as seen in Table 6 below.

Table 6 – Emission Reductions

Emission Source	Emission Inventory (tons per day)	Emission Reductions (tons per day
AER (liquid, uncontrolled)	0.87	0.47
AER (liquid, controlled)	0.43	N/A
AER (powder)	0.06	N/A
CLASS	1.42	0.77
Non-permitted	0.04	0.02
Total	**2.82**	**1.26**

PAR 1107 will partially implement CM#2007 MCS-07.

COST AND COST-EFFECTIVENESS

The cost and cost-effectiveness of the proposed rule was determined by comparing the average cost of metal coatings that exceed the proposed limit and those that are below the proposed limit. The higher-VOC metal coatings ranged between $35 and $116 per gallon with an overall average cost of $49.84. The low VOC metal coatings, taken from the list included in Appendix A,

ranged between $33 and $99 per gallon with an average cost of $55.80. The higher cost coatings typically were two-component coatings or one-component exempt solvent coatings. The low-VOC coatings were, on average, $5.96 more expensive or about 10.7 percent more expensive. Staff will continue to assess incremental costs by category during the rule development period.

The overall cost is determined by multiplying the increase in cost, $5.96 per gallon, by the total number of impacted volume of gallons that currently exceed the proposed VOC limits. The total annual cost increase is shown below in Table 7.

Table 7 – Total Annual Cost

Emission Source	Volume Impacted (gallons)	Increased cost per gallon	Total Annual Cost
AER (liquid, uncontrolled)	250,700	$5.96	$1.5 million
AER (liquid, controlled)	0	N/A	N/A
AER (powder)	0	N/A	N/A
CLASS	409,000	$5.96	$2.4 million
Non-permitted	11,500	$5.96	$0.1 million
Total	671,200	$5.96	**$4.0 million**

As proposed, the rule would reduce emissions by 1.26 tons per day with an estimated annual cost of $4.0 million dollars. The maximum overall cost-effectiveness of the proposed amendment would be $8,698 per ton of VOC emissions reduced.

INCREMENTAL COST-EFFECTIVENESS

Under Health and Safety Code Section 40920.6, the AQMD is required to perform an incremental cost analysis when adopting a Best Available Retrofit Control Technology (BARCT) rule or feasible measure required by the California Clean Air Act. To perform this analysis, the AQMD must (1) identify one or more control options achieving the emission reduction objectives for the proposed rule, (2) determine the cost effectiveness for each option, and (3) calculate the incremental cost effectiveness for each option. To determine incremental costs, the AQMD must "calculate the difference in the dollar costs divided by the difference in the emission reduction potentials between each progressively more stringent potential control option as compared to the next less expensive control option."

Two alternative options were evaluated including one more stringent standard and one less stringent standard. The first alternative examined was to require all metal coatings to meet a VOC content limit of 50 g/l. The limit would essentially require the same coatings used for architectural activities to be used for all metal coating applications. The second alternative eliminated the limits effective in 2015.

The incremental cost analysis indicates that all of the alternatives considered have a reasonable overall cost-effectiveness. The least stringent alternative is the most cost effective but would drastically reduce the emission reductions from the proposal to 0.08 tons per day. The inclusion of the proposed 2015 limits can also be accomplished in a cost effective manner. However, the incremental cost incurred by lowering the limit to 50 g/l indicates that the alternative would yield

only an additional 0.27 ton per day reduction but at twice the annual cost of the current proposal. This is summarized in Table 8 below.

Table 8 – Incremental Cost-Effectiveness

Alternative VOC Limit (g/l)	Emission Reductions (tons per year)	Annual Cost (million)	Incremental Cost ($ per additional ton reduction)	Overall Cost Effectiveness
50	557.9	$7.9	$39,574	$14,160
Current proposal	459.9	$4.0	$8,823	$8,698
Remove 2015 limits	29.2	$0.2	N/A	$6,849

COMPARATIVE ANALYSIS

Health and Safety Code Section 40727.2 requires a written analysis comparing the proposed rule with existing federal and AQMD regulations. There are no other existing or proposed AQMD rules that directly apply to the same source type (metal parts and products coating operations). The following Federal regulations apply to some or all sources regulated by Rule 1107.

The National Emission Standards for Hazardous Air Pollutants (NESHAP); Area Source Standards for Nine Metal Fabrication and Finishing Source Categories requires the control of particulates from applicable area source metal coating operations by 98 percent in a paint spray booth with dry filters or water curtain. HVLP spray equipment or others as approved by AQMD must be utilized to improve transfer efficiency. Finally, painters must complete training that addresses paint selection, mixing and application to minimize emissions. The AQMD addresses particulate capture in Rule 481 – Spray Coating Operations and Rule 1402 - Control of Toxic Air Contaminants from Existing Sources. Rule 1107 is the source and guidelines for the transfer efficiency requirements. The SCAQMD rules do not contain painter training requirements.

The NESHAP: Paint Stripping and Miscellaneous Surface Coating Operations at Area Sources requires methods to reduce or eliminate methylene chloride stripper usage, requires proper storage and disposal, optimizes application conditions, reduces exposure and requires additional recordkeeping. Proposed Rule 1107 will prohibit the usage of methylene chloride and other Group II Exempt Solvents for paint stripping.

The NESHAP: Surface Coating of Metal Furniture establishes a standard of 0.1 kg organic HAP per liter of solids (0.83 lb/gal) of metal coating for new and reconstructed sources and includes recordkeeping provisions. 1401 - New Source Review of Toxic Air Contaminants likewise regulates HAP emissions from new and relocated facilities.

The NESHAP: Surface Coating of Miscellaneous Metal Parts and Products establishes limits of 0.31 kg organic HAP per liter of solids (2.6 lb/gal) for general existing operations and 0.23 kg organic HAP per liter of solids (1.9 lb/gal) for new operations. Other limits are included for specialty categories including High Performance (3.3 kg/l), Magnet Wire (0.12 kg/l), Rubber-to-Metal (4.5 kg/l) and Extreme Performance Fluorpolymer (1.5). The NESHAP also contains administrative, notification, reporting and recordkeeping requirements. AQMD Rule 1401 -

New Source Review of Toxic Air Contaminants and Rule 1402 - Control of Toxic Air Contaminants from Existing Sources limit HAP emissions from new and existing metal coating sources.

The Control Techniques Guidelines (CTG) for Miscellaneous Metal and Plastic Parts Coatings limit the VOC content of miscellaneous metal coatings to limits similar those in Rule 1107 prior to the 2005 amendment. Additional options allow for facilities that utilize control equipment. In addition to the VOC content limits, the CTG provides work practice requirements for storage and use of metal coatings and cleaning solvents. The proposed limits in Rule 1107 are more stringent than those in the CTG. The proposed rule includes work practice requirements for the storage and use of metal coatings. Rule 1171 – Solvent Cleaning Operations contains work practice requirements for solvents used in miscellaneous metal coating operations that are equivalent or more stringent than the CTG.

The CTG for Metal Furniture Coatings recommends VOC content limits similar to those contained in the current version of Rule 1107 and includes options for averaging and the use control devices. The CTG requires the use of HVLP or equivalent spray gun use to improve transfer efficiency. Finally, the CTG includes work practice requirements for the storage and use of metal coatings and solvents. The current version of Rule 1107 includes both the VOC limits and transfer efficiency requirements of the CTG. The proposed rule will include the work practice requirements for the storage and use of metal coatings. Rule 1171 – Solvent Cleaning Operations contains work practice requirements for solvents used in miscellaneous metal coating operations.

The CTG for Large Appliance Coatings is nearly identical to the CTG for Metal Furniture Coatings except that it does not contain provisions for high transfer efficiency spray equipment.

SOCIOECONOMIC ASSESSMENT

A socioeconomic analysis of Proposed Amended Rule 1107 will be performed. A draft report will be released no later than 30 days prior to the AQMD Governing Board hearing.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Pursuant to the California Environmental Quality Act (CEQA) and AQMD Rule 110, appropriate documentation will be prepared to analyze any potential adverse environmental impacts associated with the Proposed Amended Rule 1107. Comments received at the public workshop and CEQA scoping meeting will be considered when preparing the CEQA document.

DRAFT FINDINGS UNDER THE CALIFORNIA HEALTH AND SAFETY CODE

Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the hearing. The draft findings are as follows:

Necessity – State and federal health-based ambient air quality standards for ozone are regularly and significantly exceeded in the AQMD. The reduction of VOC from Proposed Amended Rule 1107 is part of a comprehensive strategy to meet federal and state air quality standards.

Authority - The AQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from Health and Safety Code Sections 39002, 40000, 40001, 40440, 40441, 40702 and 41508.

Clarity - The AQMD Governing Board has determined that Proposed Amended Rule 1107 – Coating of Metal Parts and Products, is written and displayed so that the meaning can be easily understood by persons directly affected by them.

Consistency - The AQMD Governing Board has determined that Proposed Amended Rule 1107 – Coating of Metal Parts and Products, is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, federal or state regulations.

Non-Duplication - The AQMD Governing Board has determined that Proposed Amended Rule 1107 – Coating of Metal Parts and Products, does not impose the same requirement as any existing state or federal regulation, and the proposed amendments are necessary and proper to execute the powers and duties granted to, and imposed upon, the AQMD.

Reference - In adopting this regulation, the AQMD Governing Board references the following statutes which the AQMD hereby implements, interprets or makes specific: California Health and Safety Code sections 40001, 40440, and 40702.

REFERENCES

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U.S. Environmental Protection Agency, (September 2008), EPA-453/R-08-003, Control Techniques Guidelines for Miscellaneous Metal and Plastic Parts Coatings.

U.S. Environmental Protection Agency, (September 2007), EPA 453/R-07-005, Control Techniques Guidelines for Metal Furniture Coatings.

U.S. Environmental Protection Agency, (September 2007), EPA 453/R-07-004, Control Techniques Guidelines for Large Appliance Coatings.

Generall

MANUFACTURER NAME	PRODUCT NAME	PRODUCT NUMBER	VOC CONTENT	DRY -to- TOUCH	DRY -to- HANDLE	RECOAT	COVERAGE (@ DFT)	THINNING REQUIRED?	THINNER REQUIRED	CLEAN-UP RECOMMENDED	SHELF LIFE	CONTAINS TBAC?
Aervoe Industries, Inc.	Direct to Metal (DTM)	3010 Safety Red	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
Aervoe Industries, Inc.	Direct to Metal (DTM)	2030 Safety Yellow	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
Aervoe Industries, Inc.	Direct to Metal (DTM)	3030 Safety Blue	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
Aervoe Industries, Inc.	Direct to Metal (DTM)	3040 Safety Green	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
Aervoe Industries, Inc.	Direct to Metal (DTM)	3050 Safety Orange	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
Aervoe Industries, Inc.	Direct to Metal (DTM)	3060 Safety Black	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
Aervoe Industries, Inc.	Direct to Metal (DTM)	3070 Safety White	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
Aervoe Industries, Inc.	Direct to Metal (DTM)	3120 Flat Black	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
Aervoe Industries, Inc.	Direct to Metal (DTM)	3130 Flat White	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
Aervoe Industries, Inc.	Direct to Metal (DTM)	3490 Meter Gray	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
Cardinal Industrial Finishes	ACRYLIC URETHANE AIR DRY ENAMEL	3200 Series	159 g/L	15 minutes	2 hours		550 sq-ft/gal @ 100% TE 355 sq-ft/gal @ 65% TE (@ 1-2 mil)	Optional	Water 1% - 5%	Warm Water	6 Months - from date of manufacture	
Carboline Company	Carbocrylic 3359	3359	60 g/L As Supplied	2 Hours @ 75 F	—	2 Hours @ 75 F	577 sq-ft/gal (@ 1 mil)	Optional	May be thinned up to 6 oz/gal (5%) with clean,	Use clean potable water followed with suitable	36 months	No
Carboline Company	Carbocrylic 3359	3359	96 g/L w/6 oz #102	2 Hours @ 75 F	—	2 Hours @ 75 F	577 sq-ft/gal (@ 1 mil)	Optional	May be thinned up to 6 oz/gal (5%) with clean,	Use clean potable water followed with suitable	36 months	No
Carboline Company	Carbocrylic 120	120 Translucent White (0800)	98 g/L	1 Hour @ 75 F	—	1 hour (W/B) 24 hours (S/B)	610 sq-ft/gal (@ 1 mil)	Designed to be used as supplied	potable water.	solvent to dry equipment.	36 months	No

MANUFACTURER NAME	PRODUCT NAME	PRODUCT NUMBER	VOC CONTENT	DRY -to- TOUCH	DRY -to- HANDLE	RECOAT	COVERAGE (@ DFT)	THINNING REQUIRED?	THINNER REQUIRED	CLEAN-UP RECOMMENDED	SHELF LIFE	CONTAINS TBAC?
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T01™ White	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T02™ Black	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T03™ Yellow	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T04™ Violet	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T05™ Yellow-Orange Shade	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T06™ Red-Orange Shade	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T07™ Blue-Green Shade	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T08™ Yellow-Oxide	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T09™ Green	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T10™ Red	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T11™ White	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T12™ Red Oxide	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T13™ Orange	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T14™ Transparent Red	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T15™ Magenta	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T16™ Violet-Blue Shade	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	

MANUFACTURER NAME	PRODUCT NAME	PRODUCT NUMBER	VOC CONTENT	DRY -to- TOUCH	DRY -to- HANDLE	RECOAT	COVERAGE (@ DFT)	THINNING REQUIRED?	THINNER REQUIRED	CLEAN-UP RECOMMENDED	SHELF LIFE	CONTAINS TBAC?
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T17™ Blue-Red Shade	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane Reduced Gloss Topcoat	9T20™ Flattener	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T01™ White	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T02™ Black	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T03™ Yellow	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T04™ Violet	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T05™ Yellow-Orange Shade	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T06™ Red-Orange Shade	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T07™ Blue-Green Shade	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T08™ Yellow-Oxide	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T09™ Green	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T10™ Red	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T11™ White	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T12™ Red Oxide	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T13™ Orange	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T14™ Transparent Red	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	

MANUFACTURER NAME	PRODUCT NAME	PRODUCT NUMBER	VOC CONTENT	DRY -to- TOUCH	DRY -to- HANDLE	RECOAT	COVERAGE (@ DFT)	THINNING REQUIRED?	THINNER REQUIRED	CLEAN-UP RECOMMENDED	SHELF LIFE	CONTAINS TBAC?
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T15™ Magenta	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T16™ Violet-Blue Shade	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T17™ Blue-Red Shade	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	
DuPont Industrial Coatings	IMRON® Industrial Strength Ultra Low VOC Polyurethane High Gloss Topcoat	9T20™ Flattener	< 100 g/L	30 minutes	2 - 4 hours	Anytime	625 sq-ft/gal (@ 1 mil)	Not Required	If Needed; 10% Water	Soap & Water	3 Years	

Architectural

MANUFACTURER NAME	PRODUCT NAME	PRODUCT NUMBER	VOC CONTENT	DRY -to- TOUCH	DRY -to- HANDLE	DRY -to- RECOAT	COVERAGE (@ DFT)	THINNING REQUIRED?	THINNER REQUIRED	CLEAN-UP RECOMMENDED	SHELF LIFE	CONTAINS TBAC?
Ameron Coatings	Amershield™ VOC	Amershield Series	84 g/L	2.5 hours @ 70 °F	10 hours @ 70 °F	8 hours @ 70 °F	1171 sq-ft/gal (@ 1 mil)	Optional	Using Amercoat #65 1 pt/1 Gal	Thinner or Amercoat 12	12 Months @ 75 °F	No
Carboline Company	Carbocrylic® 3359 DTMC	3359 DTMC	44 g/L	--	6 hours @ 75 °F	2 hours @ 75 °F	642 sq-ft/gal (@ 1 mil)	None	No Thinning - As Supplied	Clean Potable Water followed by Solvent	36 Months @ 75 °F	No
Carboline Company	Carbocrylic® 3359 DTMC	3359 DTMC	44 g/L	--	6 hours @ 75 °F	2 hours @ 75 °F	642 sq-ft/gal (@ 1 mil)	Optional	If Thinning: Up to 6 oz Potable Water	Clean Potable Water followed by Solvent	36 Months @ 75 °F	No
Carboline Company	Carboguard®1209	1209	96 g/L	--	8 hours @ 75 °F	16 hours @ 75 °F	1411 sq-ft/gal (@ 1 mil)	With No Thinning	None	Thinner #2 or Acetone	36 Months @ 75 °F	No
Carboline Company	Carboguard®1209	1209	134 g/L	--	8 hours @ 75 °F	16 hours @ 75 °F	1411 sq-ft/gal (@ 1 mil)	Using Thinning	Using #213 6 oz/Gal	Thinner #2 or Acetone	36 Months @ 75 °F	No
Carboline Company	Carboguard®1207	1207	14 g/L	--	16 hours @ 75 °F	16 hours @ 75 °F	1572 sq-ft/gal (@ 1 mil)	With No Thinning	None	Thinner #2 or Acetone	36 Months @ 75 °F	No
Carboline Company	Carboguard®1207	1207	50 g/L	--	16 hours @ 75 °F	16 hours @ 75 °F	1572 sq-ft/gal (@ 1 mil)	Using Thinning	Using #213 6 oz/Gal	Thinner #2 or Acetone	36 Months @ 75 °F	No
Carboline Company	Carboguard®1207	1207	89 g/L	--	16 hours @ 75 °F	16 hours @ 75 °F	1572 sq-ft/gal (@ 1 mil)	Using Thinning	Using #213 13 oz/Gal	Thinner #2 or Acetone	36 Months @ 75 °F	No
Carboline Company	Carboline®3359 Flat	3359	60 g/L	--	2 hours @ 75 °F	2 hours @ 75 °F	577 sq-ft/gal (@ 1 mil)	With No Thinning	None	Clean Potable Water	Clean Potable Water	No
Carboline Company	Carboline®3359 Flat	3359	96 g/L	--	2 hours @ 75 °F	2 hours @ 75 °F	577 sq-ft/gal (@ 1 mil)	Using Thinning	Using #102 6 oz/Gal	Clean Potable Water	Clean Potable Water	No
Carboline Company	Carboguard® 163	163	0.0 g/L	--	--	24 hours Max	1604 sq-ft/gal (@ 1 mil)	Not Recommended	Not Recommended	Thinner #2 or Thinner #76	24 Months @ 75 °F	No
Carboline Company	Phenoline® 380	380	12 g/L	--	--	6 hours @ 75 °F	1588 sq-ft/gal (@ 1 mil)	Not Recommended	Not Recommended	Thinner #2 or Acetone	6 Months @ 75 °F	No
Carboline Company	Phenoline® 187 HS Finish	187	18 g/L	5 hours @ 77 °F	16 hours @ 77 °F	16 hours @ 77 °F	1572 sq-ft/gal (@ 1 mil)	Not Recommended	Not Recommended	Thinner #2	24 Months	No
Carboline Company	Phenoline® 310	310	0.0 g/L	--	--	4 hours @ 75 °F	1604 sq-ft/gal (@ 1 mil)	Not Recommended	Not Recommended	Thinner #2 or Acetone	6 Months @ 75 °F	No
Carboline Company	Phenoline®385	385	119 g/L	--	--	10 hours @ 75 °F	1373 sq-ft/gal (@ 1 mil)	With No Thinning	None	Thinner #2 or Acetone	Part A - 12 months, Part B - 6 months @ 75 °F	No

MANUFACTURER NAME	PRODUCT NAME	PRODUCT NUMBER	VOC CONTENT	DRY -to- TOUCH	DRY -to- HANDLE	DRY -to- RECOAT	COVERAGE (@ DFT)	THINNING REQUIRED?	THINNER REQUIRED	CLEAN-UP RECOMMENDED	SHELF LIFE	CONTAINS TBAC?
Carboline Company	Phenoline® 187 HS Primer	187	20 g/L	5 hours @ 77 °F	16 hours @ 77 °F	16 hours @ 77 °F	1568 sq-ft/gal (@ 1 mil)	With No Thinning	None	Thinner #2	24 Months	No
Carboline Company	Phenoline® 309	309	0.0 g/L	--	--	12 hours @ 75 °F	1604 sq-ft/gal (@ 1 mil)	Not Recommended	Not Recommended	Thinner #2 or Acetone	24 Months	No
Carboline Company	Polyclad 708	708	0.0 g/L	--	--	18 hours Max @ 75 °F	1604 sq-ft/gal (@ 1 mil)	Not Recommended	Not Recommended	Thinner #2 or MEK	Part A - 24 months, Part B - 12 months @ 75 °F	No
Carboline Company	Polibrid® 705	705	0.0 g/L	--	--	18 hours Max @ 75 °F	1604 sq-ft/gal (@ 1 mil)	Not Recommended	Not Recommended	Thinner #2 or MEK	12 Months @ 75 °F	No
Carboline Company	Flexxide Elastomer	None	85 g/L	1 hour @ 75 °F	5 hours @ 75 °F	5 hours @ 75 °F	721 sq-ft/gal (@ 1 mil)	Not Required	If Needed: 1/2 pt to 1 gal Potable Water	Carboline Surface Cleaner 3 then potable water rinse	24 Months @ 75 °F	No
Columbia Paint and Coatings	Universal H2O Metal Primer – White (Fast Dry, Rust-Inhibitive, Water Clean-up)	05-550	121 g/L	30 minutes @ 72 °F	1 hour @ 72 °F	2 hours @ 72 °F	1222 sq-ft/gal (@ 1 mil)	As Supplied	If Needed: 1/2 pt to 1 gal Water	Warm Soapy followed by Mineral Spirits for spray lines	24 Months	No
Devoe High Performance Coatings	DEVTHANE 379H Aliphatic Urethane Gloss Enamel	379H	< 100 g/L	--	--	6 hours @ 80 °F	1222 sq-ft/gal (@ 1 mil)	Not Required	If Needed: #800 VOC Comp Reducer or T-0 Thinner @ 10% Water	4267 Low VOC Cleaning Thinner	Over 12 months	Yes
Devoe High Performance Coatings	BAR-RUST 231 Low VOC Multi-Purpose Epoxy Mastic	231	36 g/L	--	--	10 hours @ 60 °F	1075 sq-ft/gal (@ 1 mil)	As Supplied	None	4267 Low VOC Cleaning Thinner	24 Months @ 77 °F	No
Devoe High Performance Coatings	BAR-RUST 231 Low VOC Multi-Purpose Epoxy Mastic	231	< 100 g/L	--	--	10 hours @ 60 °F	1075 sq-ft/gal (@ 1 mil)	Optional	If Needed: #800 VOC Comp Reducer @ 15% or T-0 @ 5%	4267 Low VOC Cleaning Thinner	24 Months @ 77 °F	No
Rust-Oleum Corporation	S60 Water-based Epoxy Maintenance Coating	S60 High Gloss (Stone Gray)	0.0 g/L	30 minutes @ 70-80 °F	1-2 hours @ 70-80 °F	1-2 hours @ 70-80 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	Part 1: 2 years Part 2: 3 years	No
Rust-Oleum Corporation	S60 Water-based Epoxy Maintenance Coating	S60 High Gloss (Almond)	0.0 g/L	30 minutes @ 70-80 °F	1-2 hours @ 70-80 °F	1-2 hours @ 70-80 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	Part 1: 2 years Part 2: 3 years	No
Rust-Oleum Corporation	S60 Water-based Epoxy Maintenance Coating	S60 High Gloss (OSHA Safety Red)	0.0 g/L	30 minutes @ 70-80 °F	1-2 hours @ 70-80 °F	1-2 hours @ 70-80 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	Part 1: 2 years Part 2: 3 years	No
Rust-Oleum Corporation	S60 Water-based Epoxy Maintenance Coating	S60 High Gloss (OSHA Safety Yellow)	0.0 g/L	30 minutes @ 70-80 °F	1-2 hours @ 70-80 °F	1-2 hours @ 70-80 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	Part 1: 2 years Part 2: 3 years	No

MANUFACTURER NAME	PRODUCT NAME	PRODUCT NUMBER	VOC CONTENT	DRY -to- TOUCH	DRY -to- HANDLE	DRY -to- RECOAT	COVERAGE (@ DFT)	THINNING REQUIRED?	THINNER REQUIRED	CLEAN-UP RECOMMENDED	SHELF LIFE	CONTAINS TBAC?
Rust-Oleum Corporation	S60 Water-based Epoxy Maintenance Coating	S60 High Gloss (Oyster White)	0.0 g/L	30 minutes @ 70-80 °F	1-2 hours @ 70-80 °F	1-2 hours @ 70-80 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	Part 1: 2 years Part 2: 3 years	No
Rust-Oleum Corporation	S60 Water-based Epoxy Maintenance Coating	S60 High Gloss (Black)	0.0 g/L	30 minutes @ 70-80 °F	1-2 hours @ 70-80 °F	1-2 hours @ 70-80 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	Part 1: 2 years Part 2: 3 years	No
Rust-Oleum Corporation	S60 Water-based Epoxy Maintenance Coating	S60 High Gloss (OSHA Safety Blue)	0.0 g/L	30 minutes @ 70-80 °F	1-2 hours @ 70-80 °F	1-2 hours @ 70-80 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	Part 1: 2 years Part 2: 3 years	No
Rust-Oleum Corporation	S60 Water-based Epoxy Maintenance Coating	S60 High Gloss (White Pastel Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	1-2 hours @ 70-80 °F	1-2 hours @ 70-80 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	Part 1: 2 years Part 2: 3 years	No
Rust-Oleum Corporation	S60 Water-based Epoxy Maintenance Coating	S60 High Gloss (Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	1-2 hours @ 70-80 °F	1-2 hours @ 70-80 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	Part 1: 2 years Part 2: 3 years	No
Rust-Oleum Corporation	S60 Water-based Epoxy Maintenance Coating	S60 High Gloss (Deep Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	1-2 hours @ 70-80 °F	1-2 hours @ 70-80 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	Part 1: 2 years Part 2: 3 years	No
Rust-Oleum Corporation	S60 Water-based Epoxy Maintenance Coating	S60 High Gloss (Accent Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	1-2 hours @ 70-80 °F	1-2 hours @ 70-80 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	Part 1: 2 years Part 2: 3 years	No
Rust-Oleum Corporation	S37 System Metalmax® DTM Acrylic Enamel	S37 DTM (White Pastel Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 77 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	3 years	No
Rust-Oleum Corporation	S37 System Metalmax® DTM Acrylic Enamel	S37 DTM (Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 77 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	3 years	No
Rust-Oleum Corporation	S37 System Metalmax® DTM Acrylic Enamel	S37 DTM (Deep Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 77 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	3 years	No
Rust-Oleum Corporation	S37 System Metalmax® DTM Acrylic Enamel	S37 DTM (Accent Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 77 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	3 years	No
Rust-Oleum Corporation	S37 System Metalmax® DTM Acrylic Enamel	S37 DTM (Black)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 77 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	3 years	No
Rust-Oleum Corporation	S37 System Metalmax® DTM Acrylic Enamel	S37 DTM (Safety Red)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 77 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	3 years	No
Rust-Oleum Corporation	S37 System Metalmax® DTM Acrylic Enamel	S37 DTM (Safety Yellow)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 77 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	3 years	No

MANUFACTURER NAME	PRODUCT NAME	PRODUCT NUMBER	VOC CONTENT	DRY -to- TOUCH	DRY -to- HANDLE	DRY -to- RECOAT	COVERAGE (@ DFT)	THINNING REQUIRED?	THINNER REQUIRED	CLEAN-UP RECOMMENDED	SHELF LIFE	CONTAINS TBAC?
Rust-Oleum Corporation	S37 System Metalmax® DTM Acrylic Enamel	S37 DTM (White)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 77 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	3 years	No
Rust-Oleum Corporation	S37 System Metalmax® DTM Acrylic Enamel	S37 DTM (Safety Blue)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 77 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	3 years	No
Rust-Oleum Corporation	S37 System Metalmax® DTM Acrylic Enamel	S37 DTM (Navy Gray)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 77 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	3 years	No
Rust-Oleum Corporation	S37 System Metalmax® DTM Acrylic Enamel	S37 DTM (Gray Primer)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 77 °F	640 sq-ft/gal (@ 1 mil)	Optional	If Needed: 4 Fl. Oz / Gal Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S38 Satin (White Pastel Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	481-578 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S38 Satin (Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	481-578 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S38 Satin (Deep Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	481-578 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S38 Satin (Accent Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	481-578 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S38 Satin (Deep Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	481-578 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S38 Satin (Deep Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	481-578 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S38 Satin (Deep Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	481-578 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S39 Gloss (White Pastel Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	580-610 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S39 Gloss (Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	580-610 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S39 Gloss (Deep Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	580-610 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S39 Gloss (Accent Tint Base)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	580-610 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S39 Gloss (Clear)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	580-610 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No

MANUFACTURER NAME	PRODUCT NAME	PRODUCT NUMBER	VOC CONTENT	DRY -to- TOUCH	DRY -to- HANDLE	DRY -to- RECOAT	COVERAGE (@ DFT)	THINNING REQUIRED?	THINNER REQUIRED	CLEAN-UP RECOMMENDED	SHELF LIFE	CONTAINS TBAC?
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S39 Gloss (Black)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	580-610 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S39 Gloss (White Satin)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	580-610 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S39 Gloss (Navy Gray)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	580-610 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S39 Gloss (Safety Blue)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	580-610 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S39 Gloss (Safety Red)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	580-610 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sierra Performance (Rust-Oleum Corporation)	Beyond™ Multi-Purpose Acrylic Enamel	S39 Gloss (Safety Yellow)	0.0 g/L	30 minutes @ 70-80 °F	--	2-4 hours @ 70-80 °F	580-610 sq-ft/gal (@ 1 mil)	Optional	If Needed: Thin with Water	Soap and Water	3 years	No
Sherwin Williams	PRO INDUSTRIAL 0 VOC ACRYLIC	B66-600 SERIES (GLOSS)	0.0 g/L	30 minutes @ 77 °F	5 hours @ 77 °F	5 hours @ 77 °F	140-225 sq-ft/gal (@ 1 mil)	Not Recommended by Airless	Can use up to 12.5% Reducer for Spray	Soap and Water Then Mineral Spirits	No Data	No
Sherwin Williams	PRO INDUSTRIAL 0 VOC ACRYLIC	B66-650 SERIES (SEMI-GLOSS)	0.0 g/L	30 minutes @ 77 °F	5 hours @ 77 °F	5 hours @ 77 °F	140-225 sq-ft/gal (@ 1 mil)	Not Recommended by Airless	Can use up to 12.5% Reducer for Spray	Soap and Water Then Mineral Spirits	No Data	No
Sherwin Williams	PRO INDUSTRIAL 0 VOC ACRYLIC	B66-660 SERIES (SATIN)	0.0 g/L	30 minutes @ 77 °F	5 hours @ 77 °F	5 hours @ 77 °F	140-225 sq-ft/gal (@ 1 mil)	Not Recommended by Airless	Can use up to 12.5% Reducer for Spray	Soap and Water Then Mineral Spirits	No Data	No
Sherwin Williams	MIL-DTL-53039C, Type II IK Aliphatic Polyurethane , 1.5 VOC HAPS Free Chemical Agent Resistant Coating	F93N108 (Brown)	180 g/L	5-30 hours @ 77 °F	3 hours @ 77 °F	3 hours @ 77 °F	262-499 sq-ft/gal (@ 1.8-3.0 mil)	As Supplied	Can use Reducer	MEK, MIBK, MAK, Acetone, TBAC	1 year Unopened	No
Sherwin Williams	MIL-DTL-53039C, Type II IK Aliphatic Polyurethane , 1.5 VOC HAPS Free Chemical Agent Resistant Coating	F93G109 (Green)	180 g/L	5-30 hours @ 77 °F	3 hours @ 77 °F	3 hours @ 77 °F	262-499 sq-ft/gal (@ 1.8-3.0 mil)	As Supplied	Can use Reducer	MEK, MIBK, MAK, Acetone, TBAC	1 year Unopened	No
Sherwin Williams	MIL-DTL-53039C, Type II IK Aliphatic Polyurethane , 1.5 VOC HAPS Free Chemical Agent Resistant Coating	F93H113 (Tan)	180 g/L	5-30 hours @ 77 °F	3 hours @ 77 °F	3 hours @ 77 °F	262-499 sq-ft/gal (@ 1.8-3.0 mil)	As Supplied	Can use Reducer	MEK, MIBK, MAK, Acetone, TBAC	1 year Unopened	No
Tnemec	HI-BUILD EPOXOLINE II	SERIES L69	98 g/L	--	4 hours @ 75 °F	5 hours @ 75 °F	1043 sq-ft/gal (@ 1 mil)	As Supplied	None	Thinner or MEK	12 months	No
Tnemec	HI-BUILD EPOXOLINE II	SERIES L69	98 g/L	--	4 hours @ 75 °F	5 hours @ 75 °F	1043 sq-ft/gal (@ 1 mil)	Optional	Use 5% No. 49 Thinner Up to 5%	Thinner or MEK	12 months	No
Tnemec	ENDURA-SHIELD ®	SERIES 1080	97 g/L	45 minutes @ 75 °F	6 hours @ 75 °F	6.25 hours @ 75 °F	930 sq-ft/gal (@ 1 mil)	Required	Up to 15% clean water	Use Water then Xylene	12 months	No
Tnemec	ENDURA-SHIELD ®	SERIES 1081	87 g/L	45 minutes @ 75 °F	6 hours @ 75 °F	6.25 hours @ 75 °F	978 sq-ft/gal (@ 1 mil)	Required	Up to 15% clean water	Use Water then Xylene	12 months	No
Tnemec	FLUORONAR ®	SERIES 1070V	99 g/L	30 minutes @ 70 °F	6-8 hours @ 70 °F	12-16 hours @ 70 °F	898 sq-ft/gal (@ 1 mil)	Required	Up to 10% No. 65 Thinner	Thinner or MEK	13 months	No

MANUFACTURER NAME	PRODUCT NAME	PRODUCT NUMBER	VOC CONTENT	DRY -to- TOUCH	DRY -to- HANDLE	DRY -to- RECOAT	COVERAGE (@ DFT)	THINNING REQUIRED?	THINNER REQUIRED	CLEAN-UP RECOMMENDED	SHELF LIFE	CONTAINS TBAC?
Tnemec	ENDURATONE ®	SERIES 1029	94 g/L	30 minutes @ 75 °F	2 hours @ 75 °F	2 hours @ 75 °F	643 sq-ft/gal (@ 1 mil)	Not Required	As Supplied	Water then with alcohol or MEK	13 months	No
Tnemec	ENDURATONE ®	SERIES 1029	94 g/L	30 minutes @ 75 °F	2 hours @ 75 °F	2 hours @ 75 °F	643 sq-ft/gal (@ 1 mil)	Not Required	If Thinning: 1/4 pt to 1 gal Clean Water	Water then with alcohol or MEK	12 months	No
Tnemec	CHEMBUILD ®	SERIES 135	86 g/L	6 hours @ 75 °F	18 hours @ 75 °F	24 hours @ 75 °F	1347 sq-ft/gal (@ 1 mil)	As Suppiled	None	Water then with alcohol or MEK	12 months	No
Tnemec	CHEMBUILD ®	SERIES 135	86 g/L	6 hours @ 75 °F	18 hours @ 75 °F	24 hours @ 75 °F	1347 sq-ft/gal (@ 1 mil)	Optional	If thinning: 3/4 pt to 1 gal No. 62 Thinner	Water then with alcohol or MEK	12 months	No
Tnemec	ENDURATONE ®	SERIES 1028	94 g/L	30 minutes @ 75 °F	2 hours @ 75 °F	2 hours @ 75 °F	633 sq-ft/gal (@ 1 mil)	As Suppiled	None	Water then with alcohol or MEK	12 months	No
Tnemec	ENDURATONE ®	SERIES 1028	94 g/L	30 minutes @ 75 °F	2 hours @ 75 °F	2 hours @ 75 °F	633 sq-ft/gal (@ 1 mil)	Optional	If thinning: 1/4 pt to 1 gal Clean Water	Water then with alcohol or MEK	12 months	No
Triangle Coatings Inc.	Aquapoxy™ Primer Waterbased, Epoxy Primer	283PAJ60	83 g/L	1 hour @ 77 °F	24 hours @ 77 °F	4 hours @ 77 °F	274 sq-ft/gal (@ 2 mil)	Optional	Water	Water and Detergent	12 months	No
Triangle Coatings Inc.	Aquapoxy™ Primer Waterbased, 2 Part, Epoxy Primer	283P Series	83 g/L	1 hour @ 77 °F	24 hours @ 77 °F	4 hours @ 77 °F	274 sq-ft/gal (@ 2 mil)	Optional	Water	Water and Detergent	12 months	No
Vista Paint Corporation	Uniprime 4000 Interior/Exterior 100% Acrylic Primer	4000	52.5 g/L	30 minutes	--	2-4 hours	350-450 sq-ft/gal (@ 1.8 mil)	As Suppiled	None	Soap and Water	No Data	No

Primers

MANUFACTURER NAME	PRODUCT NAME	PRODUCT NUMBER	VOC CONTENT	DRY -to- TOUCH	DRY -to- HANDLE	RECOAT	COVERAGE (@ DFT)	THINNING REQUIRED?	THINNER REQUIRED	CLEAN-UP RECOMMENDED	SHELF LIFE	CONTAINS TBAC?
Carboline Company	Carbocrylic 3356-1	0800 (Matte White)	122 g/L	N/A	2 hours @ 75 °F	2 hours @ 75 °F	770 sq-ft/gal (@ 1 mil)	Yes	Water	Water	2 Years	No
Carboline Company	Carbocrylic 3356-2	2248 (Matte Brown)	140 g/L	N/A	2 hours @ 75 °F	2 hours @ 75 °F	706 sq-ft/gal (@ 1 mil)	Yes	Water	Water	2 Years	No
Carboline Company	Carbocrylic 3356-3	0780 (Semi-gloss Grey)	116 g/L	N/A	2 hours @ 75 °F	2 hours @ 75 °F	706 sq-ft/gal (@ 1 mil)	Yes	Water	Water	2 Years	No
Carboline Company	Carbocrylic 3356-4	0341 (Semi-gloss Green)	114 g/L	N/A	2 hours @ 75 °F	2 hours @ 75 °F	722 sq-ft/gal (@ 1 mil)	Yes	Water	Water	2 Years	No
Carboline Company	Carbocrylic 3356-6	2277 (Semi-gloss Brown)	115 g/L	N/A	2 hours @ 75 °F	2 hours @ 75 °F	689 sq-ft/gal (@ 1 mil)	Yes	Water	Water	2 Years	No
Devoe High Performance Coatings	DEVRAN 203 Waterborne Epoxy Primer	203	100 g/L	Not specified	Not specified	4 hours @ 77 °F	719 sq-ft/gal (@ 1 mil)	No	Water	Acetone	1 year	No
DURON	DURA CLAD® 62 Universal Acrylic Metal Primer	DUO033305 (Off White)	91 g/L	1 hours @ 70 °F	Not specified	4 hours @ yy °F	250 sq-ft/gal (@ 1 mil)	No	N/A	Water	3 years	No
DuPont Industrial Coatings	Imron® Industrial Strength Low VOC Polyurethane Primer	9M01	73 g/L	1.25 hours @ 75 °F	3.5 hours @ 75 °F	Not specified	850 sq-ft/gal (@ 1 mil)	Yes	Imron Reducer	Imron Reducer	1 year	Yes
DuPont Industrial Coatings	Imron® Industrial Strength Low VOC Polyurethane Primer	9M02	126 g/L	1.25 hours @ 75 °F	3.5 hours @ 75 °F	Not specified	850 sq-ft/gal (@ 1 mil)	Yes	Imron Reducer	Imron Reducer	1 year	Yes
DuPont Industrial Coatings	Imron® Industrial Strength Low VOC Polyurethane Primer	T-1022	72 g/L	1.25 hours @ 75 °F	3.5 hours @ 75 °F	Not specified	850 sq-ft/gal (@ 1 mil)	Yes	Imron Reducer	Imron Reducer	1 year	Yes
DuPont Industrial Coatings	IMRON® ZV-HG™ High Gloss, Waterborne Polyurethane		24 g/L	2-3 hours @ 72 °F	Not specified	3-4 hours @ 72 °F	1,170 sq-ft/gal (@ 1 mil)	Yes	Water & Accelerator	Water and Acetone	9 months	No
Ellis Paint Company	Maximus Waterborne Primer	7962 (White)	100 g/L	0.5 hours @ 77 °F	1-2 hours @ 77 °F	1-2 hours @ 77 °F	640-648 sq-ft/gal (@ 1 mil)	Ready to Spray	Water	Water & 80/20 Exempt Solvent	1 year	No
International Building Products, Inc. (IBP)	Metal Primer		150 g/L	0.5 hours	Not specified	2 hours	375 sq-ft/gal (@ 1 mil)	No	No	Water	2 Years	No
K. Coatings, LLC	E-Z Prime™	WR-P810 (off white)	127 g/L	0.5 hours @ 70 °F	Not specified	2 hours @ 70 °F	305 sq-ft/gal (@ 1 mil)	No	Water	Water	1 year	No
K. Coatings, LLC	E-Z Prime™	WR-P811 (gray)	127 g/L	0.5 hours @ 70 °F	Not specified	2 hours @ 70 °F	305 sq-ft/gal (@ 1 mil)	No	Water	Water	1 year	No
PPG Industires, Inc.	WB Acrylic Primer Low VOC DTM interior/exterior DTM industrial	SN90908 Red	90 g/L	0.25 hours @ 77 °F	0.5 hours @ 77 °F	1 hours @ 77 °F	315 sq-ft/gal (@ 1 mil)	No	Water	Water	Not specified	No

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PORTER GUARD® DTM Acrylic Primer/Finish	PP212/PP215	135 g/L	1 hours @ 70 °F	Not specified	4 hours @ 70 °F	230 sq-ft/gal (@ 1 mil)	No	Water	Water	Not specified	No
CAL24 Caltrans Specification Red Oxide Waterbase Latex Primer	PWB1450 (Red Primer)	30 g/L	0.45 hours @ 80 °F	Not specified	8 hours @ 80 °F	734 sq-ft/gal (@ 1 mil)	No	N/A	AT17 Wash Thinner	1 year	No
TriBond W 2-part, fast dry water based epoxy primer	966P Series	97 g/L	0.3 hours @ 77 °F	0.67 hours @ yy °F	0.75 hours @ yy °F	305 sq-ft/gal (@ 1 mil)	No	Water	Water	1 year	No